

# NASA TECH BRIEF

## NASA Pasadena Office



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### Pocket-Size Microwave Radiation Hazard Detector

#### The problem:

Microwave radiation can cause serious internal burns in people working in the vicinity of high-power transmission equipment. At this time, hand-carried microwave monitors are available, but few people use them because of the inconvenience of hand carrying and because they have to be checked visually to detect the danger. These monitors are expensive and require calibration every time they are used.

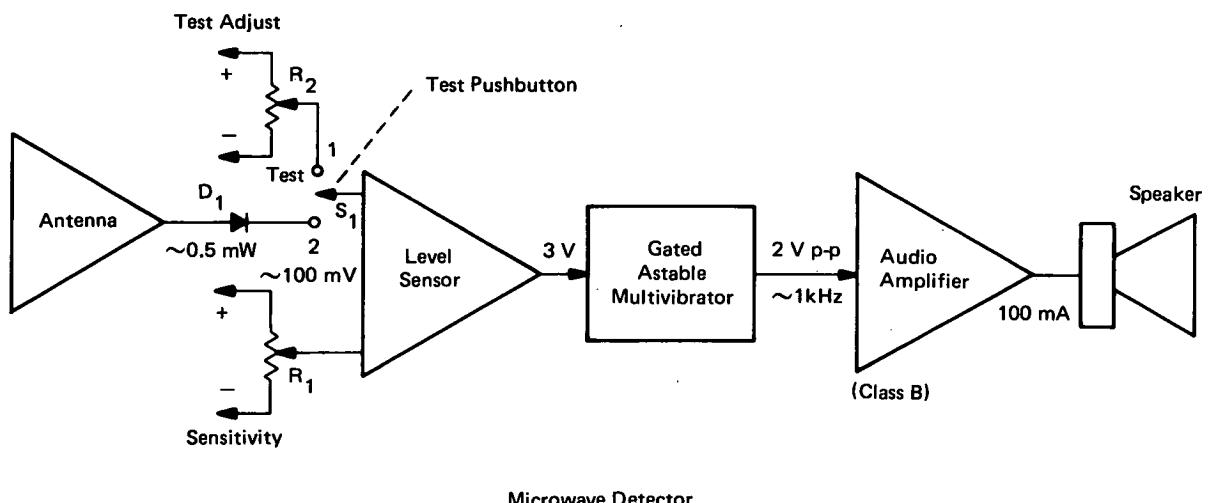
#### The solution:

An inexpensive lightweight unit has been developed for the detection of microwave radiation. Easily carried in a coat pocket or attached to a belt, the detector sounds an alarm in the presence of dangerous microwave radiation levels.

#### How it's done:

The unit consists of an antenna, a detector, a level sensor, a keyed oscillator, and a speaker. The antenna may be a single equiangular spiral or a set of orthogonal slot dipoles. The signal detector is a simple diode in a small package.

As shown in the circuit diagram, the level sensor is a standard integrated circuit, such as a  $\mu$ A710C differential comparator or its equivalent. A small potentiometer  $R_1$  sets the trip level or sensitivity.  $R_2$  is a potentiometer which sets the level at which the equivalent microwave input, developed at point 2 of pushbutton switch  $S_1$ , would represent a safety hazard. When switch  $S_1$  is pushed to position 1, an output sound is obtained which indicates that the battery and the electronics system are operational. Switch  $S_1$  is normally in position 2, except during the operational test check.



(continued overleaf)

The gated astable multivibrator (keyed oscillator) is a dual-gate (such as a  $\mu$ L915 or its equivalent) integrated circuit which is wired as an astable multivibrator to furnish the warning tone. The multivibrator is gated on by the output of the level sensor. The tone output is amplified and drives a small speaker.

**Notes:**

1. The microwave detector may be of interest to microwave equipment manufacturers and to people working on microwave antenna installations.
2. Requests for further information may be directed to:

Technology Utilization Officer  
NASA Pasadena Office  
4800 Oak Grove Drive  
Pasadena, California 91103  
Reference: B74-10097

**Patent status:**

Title to this invention, covered by U.S. Patent No. 3,753,116 has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457(f)], to the California Institute of Technology, Pasadena, California 91109.

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